Title: Metric Meals

Brief Overview:

Students will gain an understanding of the measuring units of linear metric measurement, mass and capacity and the tools needed to obtain those measurements. Students will estimate and then verify measurements of various linear metric measurements, mass and capacity. Students will convert units within the metric system. Students will write a news report regarding the effects of the mass of paper trash generated by McDonald's.

Links to Standards:

- **Mathematics as Problem Solving**
  Students will demonstrate their ability to estimate and measure metric distance, mass and capacity by determining the appropriate tool necessary to obtain these values.

- **Mathematics as Communication**
  Students will demonstrate their ability to communicate mathematically by reading, writing and discussing measurements of metric distance, mass and capacity.

- **Mathematics as Reasoning**
  Students will demonstrate their ability to make decisions about estimating metric distance, mass, and capacity by justifying answers.

- **Mathematical Connections**
  Students will demonstrate their ability to apply mathematical skills to the environment, Social Studies and the use of metric measurement in society.

- **Number and Number Relationships**
  Students will demonstrate their ability to use decimals when converting measurements.

- **Number Systems and Number Theory**
  Students will demonstrate their ability to order measurements of linear metric measurement, mass and capacity from least to greatest.

- **Computation and Estimation**
  Students will demonstrate their ability to estimate measurements of metric distance, mass and capacity. Students will demonstrate their ability to multiply and divide whole numbers and decimals.

- **Patterns and Functions**
  Students will demonstrate their ability to recognize the numeric relationship in converting measurements of metric distance, mass and capacity.

- **Algebra**
  Students will demonstrate their ability to write a rule on converting given several measurements and making a table.

- **Measurement**
  Students will demonstrate their ability to estimate and verify, by determining the appropriate unit and tool necessary, various measurements metric distance, mass and capacity. Students will demonstrate their ability to apply measuring and converting skills by determining supplies for McDonald's.

Grade/Level:

Grade 6

Duration/Length:

This activity should take 6 days including the assessment. The activities may take longer than anticipated depending on class duration and students' prior knowledge.

Prerequisite Knowledge:

Students should have working knowledge of the following skills:

- Estimating
- Ordering of decimals
- Basic understanding of the metric system
- Surface area

Objectives:

Students will:

- gain an understanding of the metric measuring units of distance, mass and capacity.
- determine the appropriate tool needed to measure metric distance, mass and capacity.
- estimate and then verify various metric measurements of distance, mass and capacity.
- convert units within the metric system.

Materials/Resources/Printed Materials:

- Rulers with metric units (mm, cm)
- Graduated cylinders (mL, L)
- Balanced scales
- Juice boxes (3 brands)
- Happy Meals
- Where the Sidewalk Ends, by Shel Silverstein
- Butcher paper

Development/Procedures:

Day 1: Introduce measurement and units of measure
Day 2: Introduce measuring instruments and obtain measurements
Day 3: Estimate and verify the order and measurements of juice boxes
Day 4: Develop conversion method using acronym
Day 5: Develop conversion method using conversion equation
See attached worksheets and resource sheets.

Performance Assessment:

The assessment of the unit is completed partly in groups and partly individually. Each group receives a Happy Meal from McDonald's. They need to estimate and measure the surface area of a hamburger wrapper, the mass of a burger, and the capacity of a regular soft drink. Individually these measurements will then be converted to represent larger numbers of Happy Meals. Students will then explore the ramifications to the environment due to the area of trash the wrappers produce. Individually students will write a news report regarding their findings.

Extension/Follow Up:

- Surface area of juice boxes
- Relationship between 1 cc and 1 mL
- Time line of the history of measurement

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Day 1- Teacher/ Student Activities

Set the purpose for listening: Students will listen for what he/she thinks the topic of the lesson will be. The answer is MEASUREMENT.

Read "One Inch Tall," pg. 55 from Shel Silverstein's Where the Sidewalk Ends aloud.

Students read the ditto about the History of Measurement (1A).

Students write and discuss WINDOWS (1B) activity for group tables of 4 students.

Teacher explains terms and prefixes for metric measurements and gives examples of the three base units.

Using the items and the cards (1C) at the stations, complete the chart (1D) for the three main metric measurements: linear distance, mass and capacity.

Match the appropriate unit of measurement needed for the item to be measured. Worksheet 1E.

Select an appropriate homework from the student's assigned text to review the mathematics terms of metric measurement for linear distance, mass and capacity.

1A The History of Measurement

The first units of length were based on the human body. For instance, a "hand" was the width of a person's palm. However, the size of the hand differed from person to person and place to place. According to tradition, the yard originally was the distance from the tip of the nose of King Henry I to the tips of his fingers. The foot is supposedly based on the foot of Charlemagne, who ruled France and neighboring areas. These rough units were sufficient for most purposes. For the purpose of accurate building, more precise measuring units were needed.

Around the year 1600, scientific experimentation began and more accurate measurement was necessary. Scientists from different countries needed to be able to communicate with each other about their work.

About 1760, the industrial revolution began. Hand tools were being replaced by power-driven machines. Accurate, consistent measurement was needed everywhere.

The writers of the U.S. Constitution in 1787 recognized the need for standardized units. One article in the Constitution reads, "The Congress shall have power...to fix the standard of weights and measures." In 1790, Thomas Jefferson proposed to Congress a measuring system based on the number 10. This would closely relate the measuring system to the decimal system. Five years later the metric system, based on the number 10, was established in France. We could have been the first country with this system, but we were emotionally tied to England, who at this time was an enemy of France. We adopted the English system of measurement instead of France's metric system.

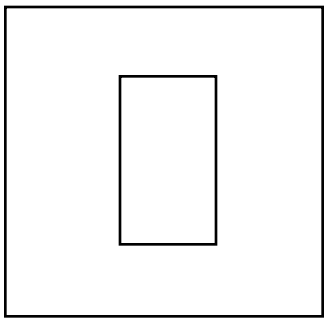
It was not until 1866 that the metric system became legal in the United States. At first, the metric system was used mainly in science. As the years went by, use of the metric system spread to more fields of study and to more countries. Even England converted to the metric system.

The old "English System" of "British Imperial system" has evolved into the "U.S. system" or the "Customary system of measurement." In the United States today, we measure in both the Customary and Metric systems.

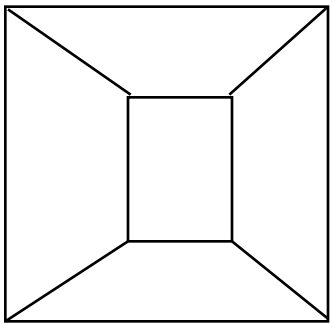
1B
WINDOWS ACTIVITY

Each group is given on piece of butcher paper and a marker for each student.

Step 1: Draw a rectangular box in the center of the paper.



Step 2: Draw a diagonal line from each corner the center box to each corner of the butcher paper.



Step 3: Each student uses the space that is shaped like a trapezoid to write his/her response to the following question:

After reading the History of Measurement , what information do you KNOW about METRIC MEASUREMENT?

Step 4: Each student discusses what he/she wrote in their own space.
Students in the group then agree on what information that they want to include in the center rectangular box. One person writes the information in the center box as information that the group agrees to include.

Step 5: Each group shares the center box responses with the rest of the class as the teacher leads the discussion.

1C

The Metric System of Measurement

Linear measurements such as Width and Length are the distance from one end (point) of an object to the opposite end (point) of that same object. Length can be measured using a ruler or meter stick. People can use kilometer or km to measure a long distance to travel such as from Baltimore to New York. A meter stick with centimeters marked on it can be used to find out your height. Carpenters use linear measurement to find the area (length x width = unit squared) of the floor to lay carpet. A dog owner can use length and width to measure the perimeter (length + length + width + width) around a space to build a fence.

Mass is the measurement for weight (the amount gravity places on an object). Mass can be measured using a balance scale. Your body mass can be measured using kilograms of kg. Drugstores fill vitamins and tablets in milligrams of mg.

Capacity is the measurement of the amount of space that matter occupies. Capacity can be measured using a graduated cylinder. Soft drink manufacturers are now selling your favorite soda in one-liter and two-liter containers. Automobile gas tank size is measured in liters. Doctors can prescribe some types of medicine in milliliters for you. Your pharmacist then fills the prescriptions for cough syrup in milliliters. Your grocery store has cans and bottles which have the capacity in milliliters (ml) printed on the label.

Metric Measurement Chart 1D

	kilo 1000	hecto 100	deka 10	Base Unit 1	deci 0.1	centi 0.01	milli 0.001
LENGTH	km	hm	dam	METER m	dm	cm	mm
MASS	kg	hg	dag	GRAMS g	dg	cg	mg
LIQUID CAPACITY	kL	hL	daL	LITER L	dL	cL	mL

Metric Measurement Chart 1D

Answer key

	kilo 1000	hecto 100	deka 10	Base Unit 1	deci 0.1	centi 0.01	milli 0.001
LINEAR Length, width thickness ruler	km length of ten soccer fields end to end	hm	dam	METER m length of a softball bat	dm	cm width of the little finger	mm thickness of a dime
MASS weight balance scale	kg textbook	hg	dag	GRAMS g paperclip	dg	cg	mg lemon seed
LIQUID CAPACITY space occupied graduated cylinders	kL	hL	daL	LITER L 1 liter soda bottle	dL	cL	mL one drop of water from eye dropper

Worksheet - To be used with Introduction to Measurement - Day 1 1E

Name _____

Date _____ Sec. _____

Match the items with the correct unit of measurement used for linear measure, capacity or mass.

Items	**Unit of measurement**
_____ Mass of a horse	cm
_____ Thickness of a dime	g
_____ Width of a piece of bread	m
_____ Capacity of a swimming pool	mL
_____ Mass of an orange	mm
_____ Capacity of a tablespoon	kL
_____ Width of a football field	kg

Worksheet **Answer sheet** - To be used with Introduction to Measurement - Day 1 1E

Name _____

Date _____ Sec. _____

Match the items with the correct unit of measurement used for linear measure, capacity or mass.

Items	**Unit of measurement**
_kg_ Mass of a horse	cm
_mm_ Thickness of a dime	g
_cm_ Width of a piece of bread	m
_kL_ Capacity of a swimming pool	mL
_g_ Mass of an orange	mm
_mL_ Capacity of a tablespoon	kL
_m_ Width of a football field	kg

Day 2 Teacher/ Student Activities

Demonstrate how to use the instruments to measure each object's characteristics (2A)
Overheads provided for explanation of how to use the tools.

Explain group station procedures (2B).
Students work in groups of four rotating to each station, for approximately ten minutes each to complete metric measurement stations form (2C).

Compare group results by oral discussion.

Give the ticket to go (2D) to the students and collect it from each student as he/she leaves the classroom.

Select an appropriate homework from the student's assigned text to review the concept and practice reading instruments to for metric measurement of linear distance, mass and capacity.

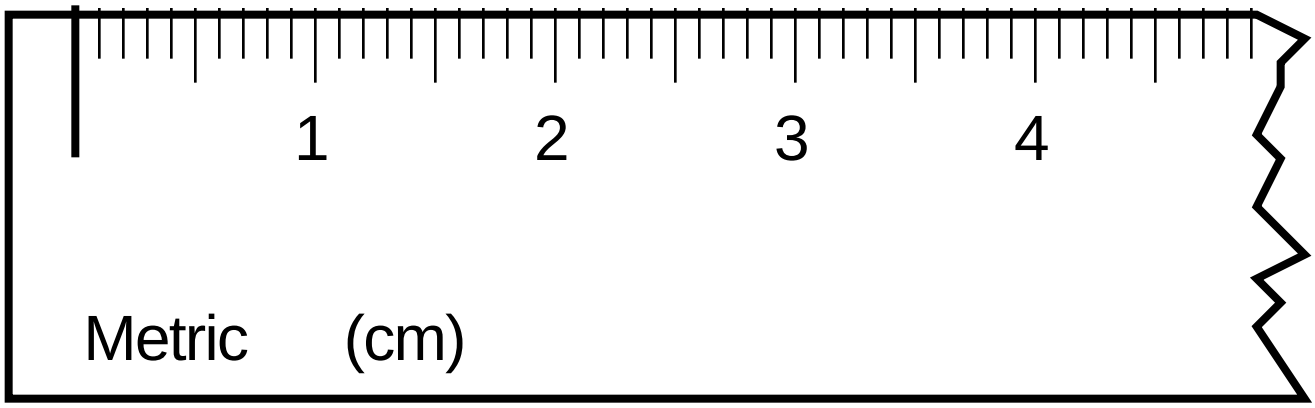
Linear Measurement 2A

How to read the ruler or meter stick to measure length, width, or thickness

On the ruler, each centimeter (the large numbers shown) is divided into 10 equal parts. Each part is one millimeter.

10 mm = 1 cm

Never begin measuring length using a ruler by starting at the end of the ruler.



The first large and bold line identifies ZERO. You must start at zero NOT at the end of the ruler.

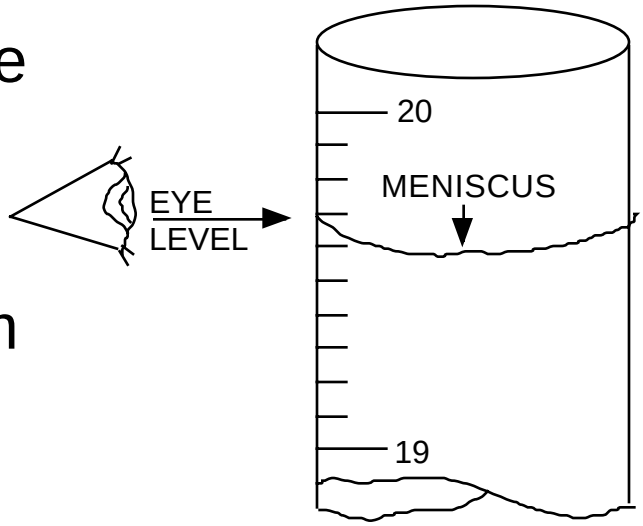
Why do you think rulers do not start ZERO at the very end of the ruler?

Capacity (2A)

How to read the MENISCUS on a Graduated Cylinder

The liter is a metric unit for measuring liquids. Scientists use a graduated cylinder to measure the liquid volume in terms of capacity. Some graduated cylinders will hold one liter, while others hold less than one liter.

First, notice that the liquid forms a curved line along the scale. This line is called the MENISCUS.



Second, read the bottom of the curved line or the MENISCUS. Move so you are at eye level with the bottom of this curved line. Look across at the scale and read the number.

The volume of liquid at the right is 19.6 mL.

STATION SET UP (2B)

A) The teacher can use the list below to select 3 items for **EACH** station.

Station #1: Linear -longest side
Station #2: Mass
Station #3: Capacity

B) Select 3 items for each station

Item	Linear	Mass	Capacity
pink eraser	X	X	
five cereal bowls			X
bar of soup	X	X	
apple		X	
straw	X	X	X
coffee mug	X	X	X
soup can	X	X	X
variety of balls	X	X	
walnut		X	
marble		X	
fish bowl	X	X	X
cup, glass	X	X	X
bucket	X	X	X
door	X		
back of the chair	X		
book	X	X	
milk, juice containers	X	X	X
shoe	X	X	
pencil	X	X	
distance between rooms	X		
person	X	X	
length/width of hallway	X		
chalkboard ledge			

C. Procedures for the lab (see student worksheet for Metric Measurement Stations)

Metric Measurement Stations (2C)

Names

Directions:
A) Rotate around to each Metric Measurement Station
B) Locate the objects that you are to measure
C) Locate the instrument you are to use to measure each object
D) Decide what unit is most appropriate to use and complete the chart

A) Circle the station number 1 2 3

B) List the three objects you are asked to measure

C) Write the instrument that is located at this station

D) Select the most appropriate unit to use

ITEMS	ESTIMATED MEASUREMENT	ACTUAL MEASUREMENT	NUMBER THE ITEMS FROM LEAST = 1 TO GREATEST = 3

(2D)

Ticket to go:

1. Give an example of what someone might need to measure, what metric unit would be most appropriate, and what instrument would be used.

_____
_____
_____
_____
_____

2. Compare the metric system of measurement to the original system of measurement based on the human body. What are the advantages of the metric system of measurement?

_____
_____
_____
_____
_____
_____
_____

Day 3 Teacher/Student Activities

Work in groups to estimate and verify the order of Juice Drink Boxes according to the Metric Measurements for linear measurement, mass and capacity (3A)

1. **List** the three juice boxes (A, B, and C) **in order** from least to greatest capacity, linear measurement, and mass.
2. **Estimate** the measurements of capacity, linear measurement, and mass for each box. Be sure to choose the appropriate unit of metric measurement for each box.
3. **Measure** the **actual** capacity, linear measurements, and the mass for each box.
4. **Write** about the juice box group activity.

Write to communicate using a writing prompt (3B)

Note: Suggested Juice Drink Box Brands
Yoo-hoo chocolate drink
Minute Maid
Ssips

Worksheet (3A) - For juice box assignment Day 3.

Name _____

Part I

Date _____ Sec. _____

1. You are asked to order, estimate and then find the actual **linear measurement** for the **height** of each box.

2. Select a common unit to measure and compare each item. _____

3. Order and list the items from least to greatest according to **height**.	4. **Estimate** the measurement.*	5. Record the **actual** measurement.*	6. Use the **actual** measurement to **number the item** from least =1 to greatest = 3.
_____			
_____			
_____			

* Be sure to use and include the common unit from your selection above when you estimate and measure each item.

Part II

1. You are asked to order, estimate and then find the actual **capacity** measurement for each box.

2. Select a common unit to measure and compare each item. _____

3. Order and list the items from least to greatest according to **capacity**.	4. **Estimate** the measurement.*	5. Record the **actual** measurement.*	6. Use the **actual** measurement to **number the item** from least =1 to greatest = 3.

_____

_____

_____

* Be sure to use and include the common unit from your selection above when you estimate and measure each item.

Part III

1. You are asked to order, estimate and then find the actual **mass** measurement for each box.

2. Select a common unit to measure and compare each item. _____

3. Order and list the items from least to greatest according to **mass**.	4. **Estimate** the measurement.*	5. Record the **actual** measurement.*	6. Use the **actual** measurement to **number the item** from least =1 to greatest = 3.

_____

_____

_____

* Be sure to use and include the common unit from your selection above when you estimate and measure each item.

Part IV: Writing Prompt (3B)

In a paragraph or more, describe for your teacher the process you used to find the **actual** measurements of the juice boxes.

Before you begin writing be sure to brainstorm your ideas. Think about **what** you were asked to measure. Think about **how you decided** what unit you selected to use. Think about **what instrument** you decided to use. Think about **what conclusions** you can draw from the data.

Now in **a paragraph or more**, describe for your teacher **the process you used** to find the **actual** measurements of the juice boxes.

RUBRIC for JUICE BOX WRITING PROMPT

4	**-**	**Answers all four think abouts with adequate support** **Uses appropriate math terms** **Writes in complete sentences**
3	**-**	**Answers at least three think abouts with adequate support** **Uses appropriate math terms** **Writes in complete sentences**
2	**-**	**Answers at least two think abouts with adequate support** **Uses appropriate math terms**
1	**-**	**Answers at least one think about with adequate support**
0	**-**	**No response given**

Day 4 Teacher/ Student Activities

Suggested Class Activity for Conversion with the Acronym

Have 7 students move to the front of the room. Each student is given a small poster with one of these words on it: kilometer, hectometer, dekameter, meter, decimeter, centimeter, and millimeter. In addition each student has another small poster with an arrow on it. Have the students respond to conversion problems by stepping forward if they are part of the conversion and pointing with their arrow in the direction the conversion moves.

Assess different groups of students.
Worksheet attached. (4A) Additional practice time may be necessary.

Day 4 - **Conversion Within the Metric System Using an Acronym** (4A)

King Henry's Daughter Makes Delicious Chocolate Milk

km hm dam m dm cm mm
(deka) (deci)

To convert from km to cm, count the steps to the right and move the decimal point that number of spaces to the right.

Ex: 4km = ? cm count -> 5 = 400,000 cm
17hm=? cm count ->4 = 170,000 cm

To convert from cm to km, count the steps to the left and move the decimal point that number of spaces to the left.

Ex: 300 cm = ? m count->2 = 300 = 3 m

*** * * * * * * * * * * * ***

King Henry's Daughter Gulps Delicious Chocolate Milk

kg hg dag g dg cg mg
(deka) (deci)

To convert from kg to cg, count the steps to the right and move the decimal point that number of spaces to the right.

Ex: 3 kg = ? cg count -> 5 = 300,000 cg
10 hg=? cg count ->4 = 100,000 cg

To convert from cg to kg, count the steps to the left and move the decimal point that number of spaces to the left.

Ex: 4000 mg = ? g count ->3 =4000 =4 mg

*** * * * * * * * * * * * ***

King Henry's Daughter Loves Delicious Chocolate Milk

kL hL daL L dL cL mL
(deka) (deci)

To convert from kL to cL, count the steps to the right and move the decimal point that number of spaces to the right.

Ex: 2 kL = ? cL count -> 5 = 200,000 cL
9 hL=? cL count ->4 = 90,000 cL

To convert from cL to kL, count the steps to the left and move the decimal point that number of spaces to the left.

Ex: 4000 mL = ? L count ->3 =4000 =4 mL

Day 4 - Worksheet for use with conversion acronym (4A)

Name _____

Date _____ Sec. _____# ____

Metric System

Convert (Show your work)

Example: 300 cm to _____ m

km hm dam m dm cm mm

meter is 2 steps to the left of centimeter therefore move the decimal point (that is behind the 300.0) two places to the left.

Example: 300 cm to 3 m

1. 8 km to _____ m
2. 325 mm to _____ m
3. 5 kg to _____ cg
4. 3 hectometers to _____ decimeters
5. 8m to _____ mm
6. 3.46 km to _____ m
7. Oriole Park at Camden Yards is 2896819.2 cm from my home. Can you convert this to a more manageable metric form?
8. How many meters are in 5 3/4 km?
9. How many liters are in 5,050 mL?
10. Should most students be able to walk one kilometer in an hour? Justify your answer.

Day 4 - Worksheet/ Answer Sheet for use with conversion acronym (4A)

Name _____

Date _____ Sec. _____# ____

Metric System (Answer Sheet)

Convert (Show your work)

Example: 300 cm to _____ m

km hm dam m dm cm mm

meter is 2 steps to the left of centimeter therefore move the decimal point (that is behind the 300.0) two places to the left.

Example: 300 cm to 3 m

1. 8 km to _____800__ m
2. 325 mm to ____.325__ m
3. 5 kg to _500,000__ cg
4. 3 hectometers to ____3000__ decimeters
5. 8m to _____8000__ mm
6. 3.46 km to ___3460__ m
7. Oriole Park at Camden Yards is 2896819.2 cm from my home. Can you convert this to a more manageable metric form?

   28.968192 km or about 29 km
8. How many meters are in 5 3/4 km? 5750 m
9. How many liters are in 5,050 mL? 5.05 L
10. Should most students be able to walk one kilometer in an hour? Justify your answer. One kilometer is 1000 meters. (A meter is slightly more than a yard.) This would be a leisurely walk in an hour's time.

Day 5 Teacher/ Student Activities

Suggested Class Activity for Conversion using the Conversion Equations.

Using magnetized sentence strip card stock with the terms: 1 mm, 1 cm, 1 m, 1 km, 1 kg, 1 mg, 1 mL, 1 L arranged on a magnetized chalkboard (if available) have the students develop the second half of the conversion equations. (5A)

Day 5 (5A)

Conversion Equations for Metric Units

Length	Mass	Capacity
100 cm = 1 m	**1000 g = 1 kg**	**1000 mL = 1 L**
1 cm = 0.01 m	**1 mg = 0.001 g**	**1 mL = 0.001 L**
1 cm = 10 mm		
1 mm = 0.001 m		
1000 mm = 1 m		
1 km = 1000 m		
1 m = 0.001 km		

Procedure:

1. Write the question?
2. Write the conversion equation.
3. Multiply both sides by the number to be converted.
4. Resulting equation will be the answer.

Ex: Katie's dog weighs 35 kilograms. How much is this in grams?

First write the conversion equation: 1 kg = 1000 grams
Since we are asking about 35 kg,
multiply both sides by 35. 35 x 1 kg = 35 x 1000 grams
Solution: 35 kg = 35000 grams

Practice: 1. A race is 2500000 centimeters long. How long is this in meters?
Conversion equation : 1 cm = 0.01 m
Multiply both sides by 2500000: 2500000 x 1 cm = 2500000 x 0.01 m
Solution: 2500000 cm = 25000 m

2. Convert this meter measure to kilometers. 25000 m = ? km
Conversion equation : 1 m = 0.001 km
Multiply both sides by 25000: 25000 x 1 m = 0.001 km x 25000
Solution: 25000 m = 25 km

3. How many milliliters in 4 liters of soda?
Conversion equation: 1 L = 1000 mL
Multiply both sides by 4: 4 x 1 L = 1000 mL x 4
Solution: 4 L = 4000 mL

Day 5 - Worksheet for use with the Conversion Equation (5B)

Name _____

Date _____ Sec. _____# ____

Conversion Using the Conversion Equation

Convert (Show your work)

Length	**Mass**	**Capacity**
100 cm = 1 m	**1000 g = 1 kg**	**1000 L = 1 mL**
1 cm = 0.01 m	**1 mg = 0.001 g**	**1 mL = 0.001 L**
1 cm = 10 mm		
1 mm = 0.001 m		
1000 mm = 1 m		
1 km = 1000 m		
1 m = 0.001 km		

Procedure:

1.	Write the question?	Ex: 8 kg = ? g
2.	Write the conversion equation.	1 kg = 1000 g
3.	Multiply both sides by the number to be converted.	8 x 1 kg = 1000g x 8
4.	Resulting equation will be the answer.	8 kg = 8000 g

Practice:

1.	3 m = ? cm	2.	1.6 m = ? cm
3.	250 cm = ? m	4.	50 mg = ? g
5.	5000 mL = ? L	6.	4569 g = ? kg

Day 5 - Worksheet/ Answer sheet for use with the Conversion Equation

Name _____

Date _____ Sec. _____# ____

Conversion Using the Conversion Equation (Answer sheet)

Convert (Show your work)

Length	Mass	Capacity
100 cm = 1 m	**1000 g = 1 kg**	**1000 L = 1 mL**
1 cm = 0.01 m	**1 mg = 0.001 g**	**1 mL = 0.001 L**
1 cm = 10 mm		
1 mm = 0.001 m		
1000 mm = 1 m		
1 km = 1000 m		
1 m = 0.001 km		

Procedure:

1.	Write the question?	Ex: 8 kg = ? g
2.	Write the conversion equation.	1 kg = 1000 g
3.	Multiply both sides by the number to be converted.	8 x 1 kg = 1000g x 8
4.	Resulting equation will be the answer.	8 kg = 8000 g

Practice:

1.	3 m = ? cm 300 cm	2.	1.6 m = ? cm 160 cm
3.	250 cm = ? m 2.5 m	4.	50 mg = ? g 0.05 g
5.	5000 mL = ? L 5 L	6.	4569 g = ? kg 4.569 kg

Culminating Activity
Proposal

Today's news reported that the McDonald's Restaurant on Liberty Road sold 537 Hamburger Happy Meals on an average day this year.

Part One Estimation of Measurement

1. What is the measure of the hamburger in your Happy Meal in grams?
2. What is the measure of the soda in your Happy Meal in the milliliters?
3. What is the measure of the surface area of the hamburger wrapper in the Happy Meal in square centimeters?

Part Two Actual Measurement

1. What is the measure of the hamburger in your Happy Meal in grams?
2. What is the measure of the soda in your Happy Meal in the milliliters?
3. What is the measure of the surface area of the hamburger wrapper in the Happy Meal in square centimeters?

Part Three Inventory Order

The manager at McDonald's needs to order supplies for Happy Meals. Meat is ordered in kilograms, soda is ordered in liters, and paper wrappers are ordered in square meters.

1. How many kilograms of meat are needed for one month (30 days)?
2. How many liters of soda are needed for one month (30 days)?
3. How many square meters of wrapper paper are needed for one month (30 days)?
4. How many kilograms of meat are needed for one year (365 days)?
5. How many kiloliters of soda are needed for one year (365 days)?
6. How many square meters of wrapper paper are needed for one year (365 days)?

Part Four Miscellaneous

1. If on a typical day 537 Happy Meals are sold. Would every day be the exactly same number of sales? Would every day be approximately the same number of sales? Would every month be approximately the same number of sales? Justify your answers.

Part Five - News Report

1. In part three you determined the amount of square meters of wrapper paper needed for one year. Would you estimate the amount of paper be equivalent to:

   a. a football field b. a school classroom c. State of Maryland
   d. City of Baltimore e. King's Dominion

2. The correct answer to #1 is a football field. This represents the wrappers from just one store. There are approximately 21,000 McDonald's in the United States. How much surface area, in square kilometers, of paper would be used for one year?

3. Prepare a national news report on the effects of wrapper paper on the environment. Image how much trash these wrappers generate. What would you expect the effect would be environmentally? Use the area computed in question 3 to help support your answer. What are some recommendations for possible ways of reducing the trash.

Culminating Activity Answer Sheet

Student Name _____ Date _____

INDIVIDUAL

Part One Part Two

ITEM	ESTIMATION	ACTUAL
MEAT		
SODA		
WRAPPERS		

INVENTORY

Part Three

ITEM	ONE MONTH	ONE YEAR
MEAT		
SODA		
WRAPPERS		

Culminating Activity
Answer Sheet

Part Four (Justify all answers)

Would every day be exactly the same number? _____

_____

_____

Would every day be approximately the same number of sales? _____

_____

_____

Would every month be approximately the same number of sales? _____

_____

_____

Part Five

_____

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SCORING RUBRIC FOR ASSESSMENT:

The responses reflect the ability to determine a measurement of linear metric measurement, mass and capacity. The responses also reflect the ability to convert units within the metric system.

Part Two

2: All measurements correct within a reasonable margin of error.
(+/- 10 g, +/- 10 mL, +/- 2 sq. cm)

1: Two of the three measurements correct within a reasonable margin of error.
(+/- 10 g, +/- 10 mL, +/- 2 sq. cm)

0: All other responses.

Part Three

2: All measurements correct within a reasonable margin of error.
(Month: +/- 0.03 kg, +/- 0.03 L, +/- .02 sq. m)
(Year: +/- 0.4 kg, +/- 0.4 kL, +/- .002 sq. m)

1: Four of the six measurements correct within a reasonable margin of error.
(Month: +/- 0.03 kg, +/- 0.03 L, +/- .02 sq. m)
(Year: +/- 0.4 kg, +/- 0.4 kL, +/- .002 sq. m)

0: All other responses.

Part Four

1: Answers all three questions with appropriate justification.

0: All other responses.

Part Five

1: News report answers question with appropriate justification.

0: All other responses.